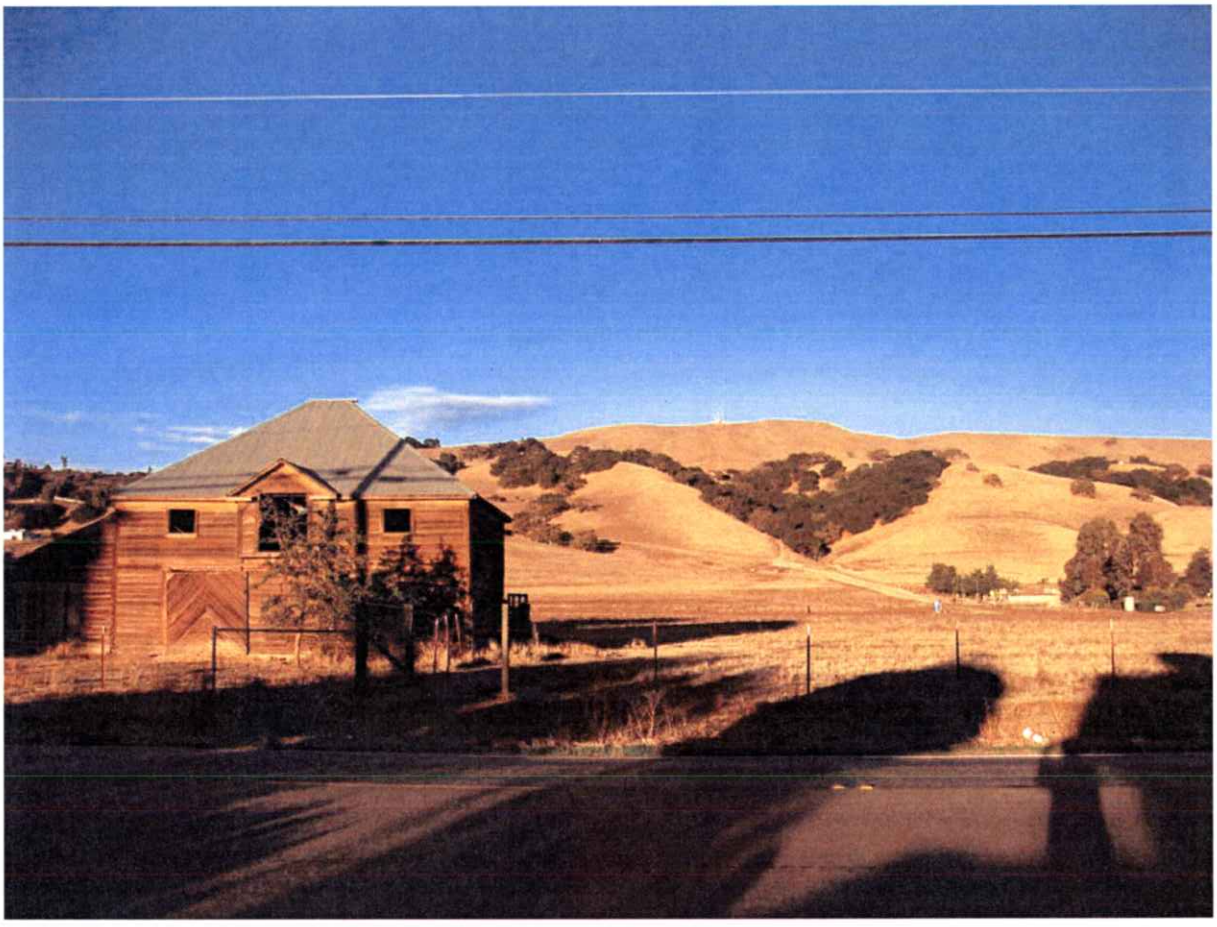
DESIGN GUIDELINES



4. DESIGN GUIDELINES

The Trails Study concept was developed from the goals set by the Trails Steering Committee, from meetings with City Staff and from public input. Design guidelines will assist the city in implementing the trail program by establishing standards for new trail development.

The standards are based on safety considerations, accessibility for all users, and overall appearance of the trail system. Where feasible, the design of countywide trails should recognize the intent of the Americans With Disabilities Act (ADA) and should emphasize accessibility for everyone. All trails should conform to the Caltrans Class I requirements for Bike Paths and the Valley Transportation Authority's Bicycle Technical Guidelines.

4.1 TYPES OF TRAILS

Four major trail types are discussed in this report: paved multi-use trails, sidewalk trail connections, improved trails and unpaved trails.

PAVED TRAIL
The paved trail is a multi-use trail and will function as the primary trail type in the more developed parts of Morgan Hill. Multi-use trails can serve pedestrians and bicyclists and will provide access for disabled persons. Trail barriers and slopes can be designed to permit passage by persons in wheelchairs.

Preferred Standards:	
Optimum width	12.0'
Minimum vertical clearance	12.0'
Horizontal clearance	16.0'
Optimum cross slope	1-2%
Recommended surface	Asphalt

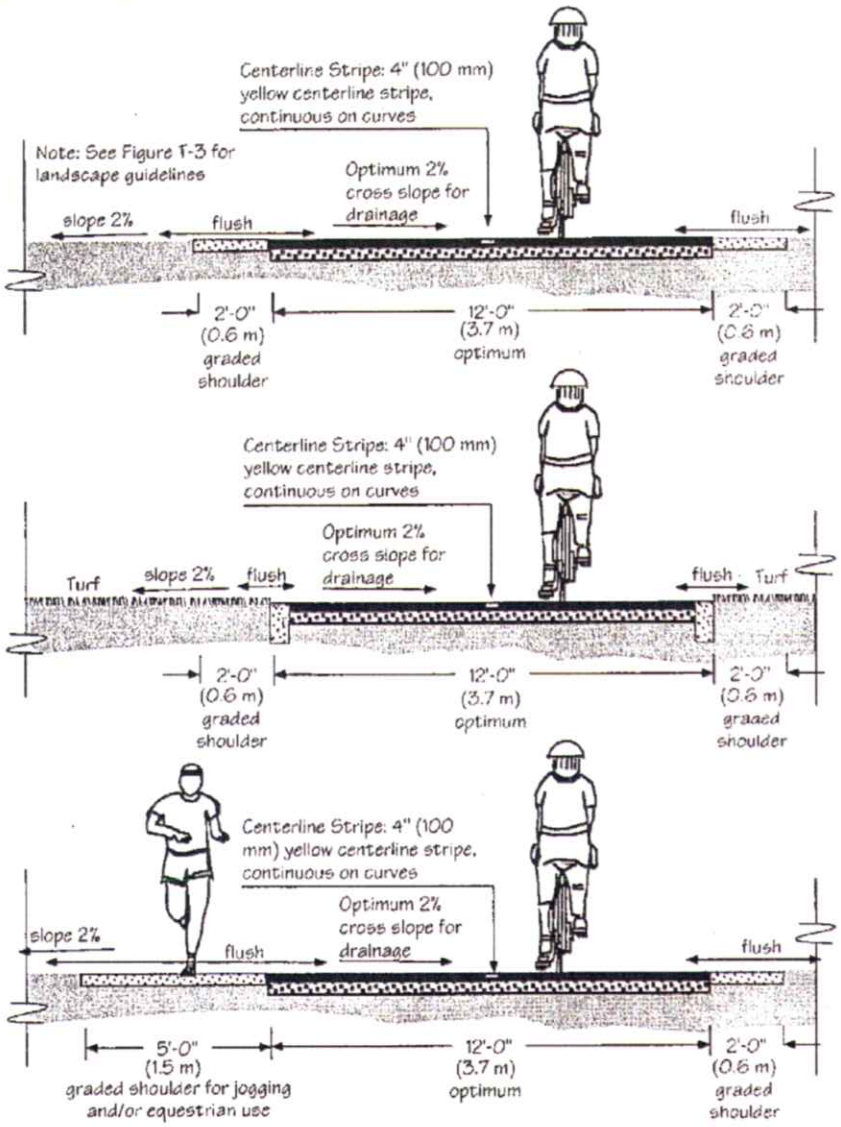
SIDEWALK TRAIL CONNECTION
The Sidewalk Trail Connections identify key sidewalks in the City of Morgan Hill that are necessary for linking off-sidewalk trails. Design and construction standards for sidewalks should follow the City and County standards. Depending on location and conditions, these connections could take the form of a concrete sidewalk and curb, or a separated asphalt path, similar to the guidelines for the paved trail.

IMPROVED TRAIL
Improved trails will have soft surfaces such as decomposed granite. These trails may be built as temporary first phase of a paved trail or as a permanent trail that does not require hard paving.

Preferred Standards:	
Optimum width	6.0'
Minimum vertical clearance	7.0'
Horizontal clearance	8.0'
Maximum cross slope	2%
Maximum grade	12.5%
Recommended surface	Compacted Granular Surface

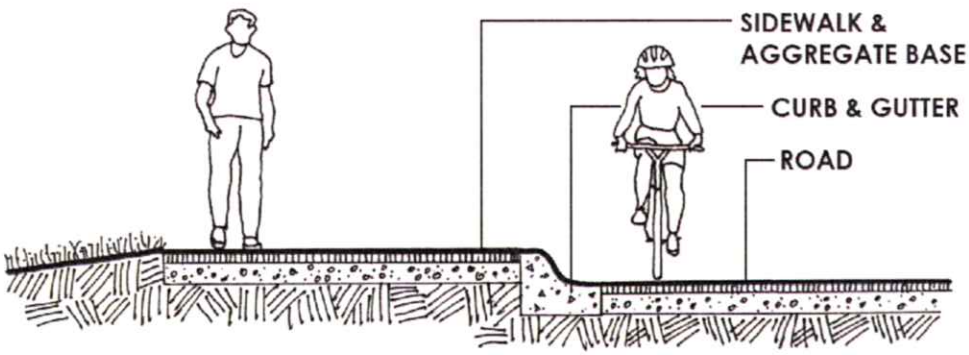
UNPAVED TRAIL
These trails will provide access to open space areas in Morgan Hill, including underdeveloped areas and ridges. Whenever possible, unpaved trails will utilize existing utility easements, other unpaved roads or trails. Open space trails may be as narrow as 3' to as wide as a fire road. They may serve pedestrians, bicyclists and equestrians depending on permitted uses.

PAVED TRAIL OPTIONS

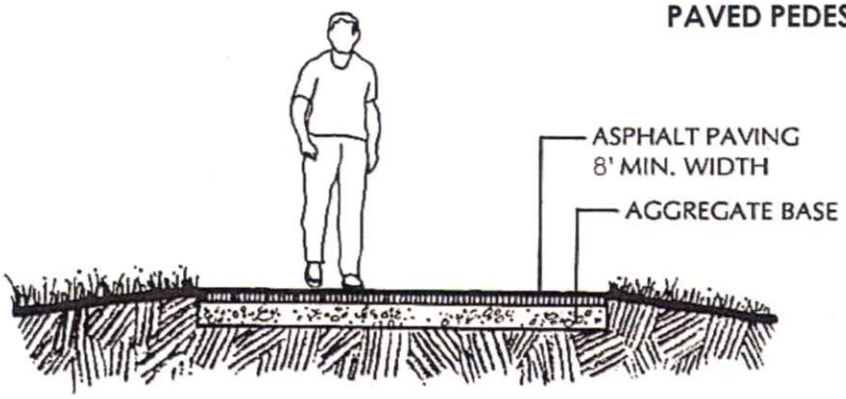


Source: Uniform Interjurisdictional Trail Design, Use, and Management Guidelines, April 1999

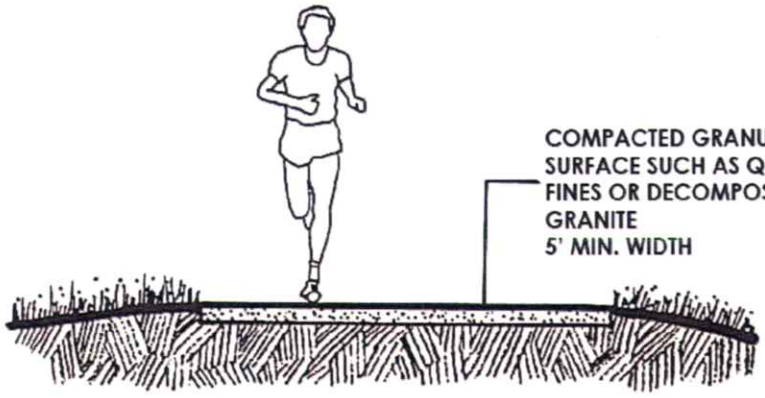
SIDEWALK TRAIL CONNECTIONS



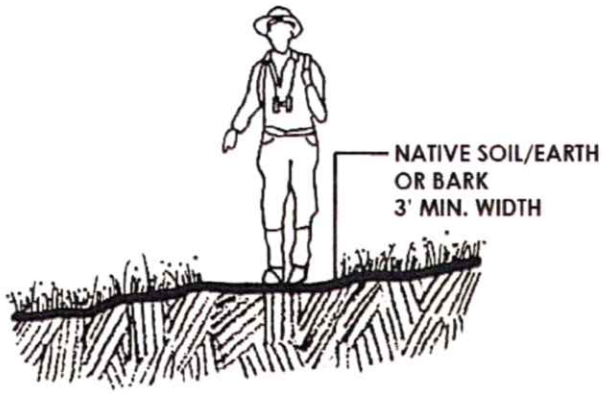
PAVED PEDESTRIAN TRAIL



IMPROVED TRAIL



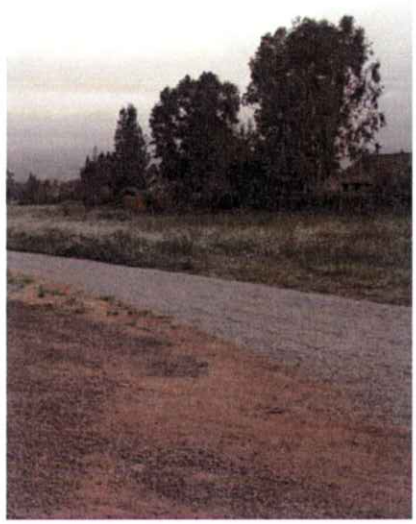
UNPAVED TRAIL

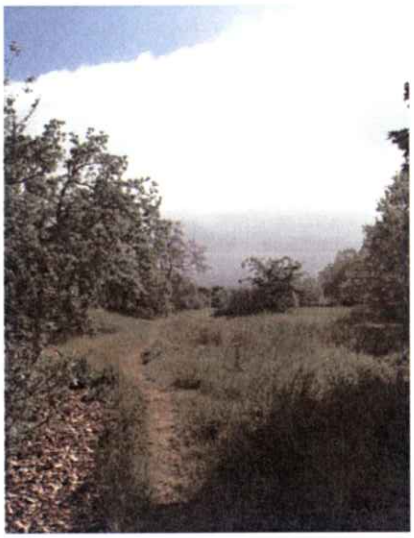


Preferred Standards:	
Optimum width	5.0'
Minimum vertical clearance	7.0'
Horizontal clearance	5.0'
Maximum cross slope	3%
Maximum grade	12.5%
Recommended surface	Native Soil/Earth or Bark

DEFINITION OF A MAJOR CORRIDOR TRAIL

Major Corridor Trials are defined as the most important trails in Morgan Hill. They range from cross-city connections to important neighborhood trails. Ideally, Major Corridor Trails are multi-use trails: paved two-way paths with an optimum width of 12 feet with a center stripe, and 2' minimum flush graded shoulders or clear space on each side of the trail. However, there are multiple design possibilities depending on the existing conditions and intended use.





4.2 TRAIL GUIDELINES & CONDITIONS

TRAIL GUIDELINES

Trail guidelines have been established to aid in planning new trails. The guidelines help in planning safe trails for users and maintaining security and privacy for property owners adjacent to trails.

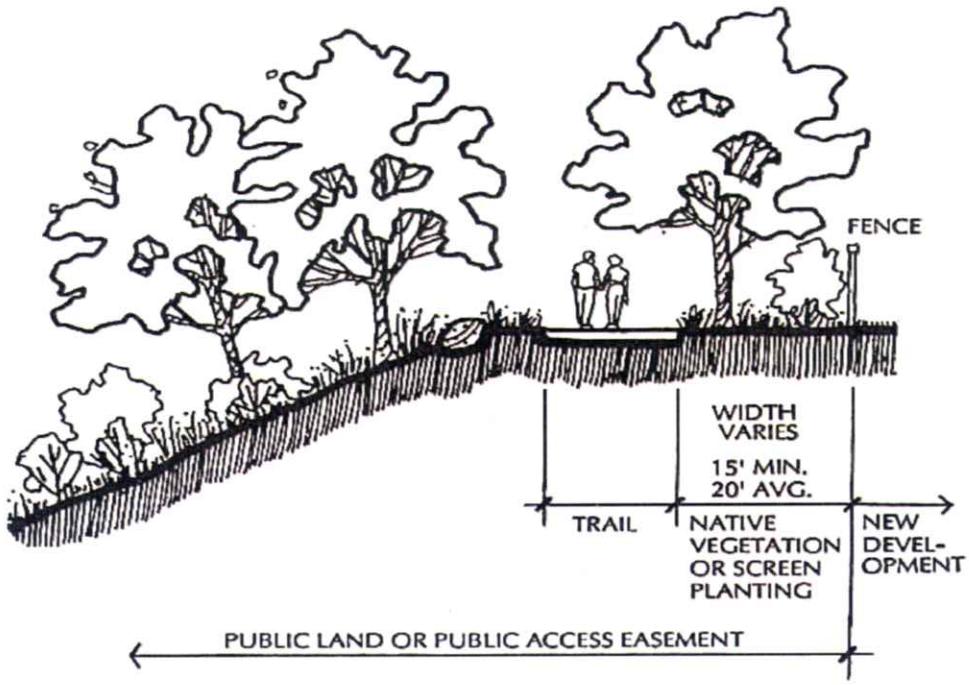
There are trail guidelines for two basic situations: trails at proposed new developments and trails at existing developed property. In the first situation, trails can be included in the development planning process. This can result in safe trails with good access and minimize potential conflicts with the planned land use.

Guidelines for trails at existing private property will seek to provide safe access and maintain privacy and security of neighbors. This will be accomplished by the use of setbacks and screening vegetation.

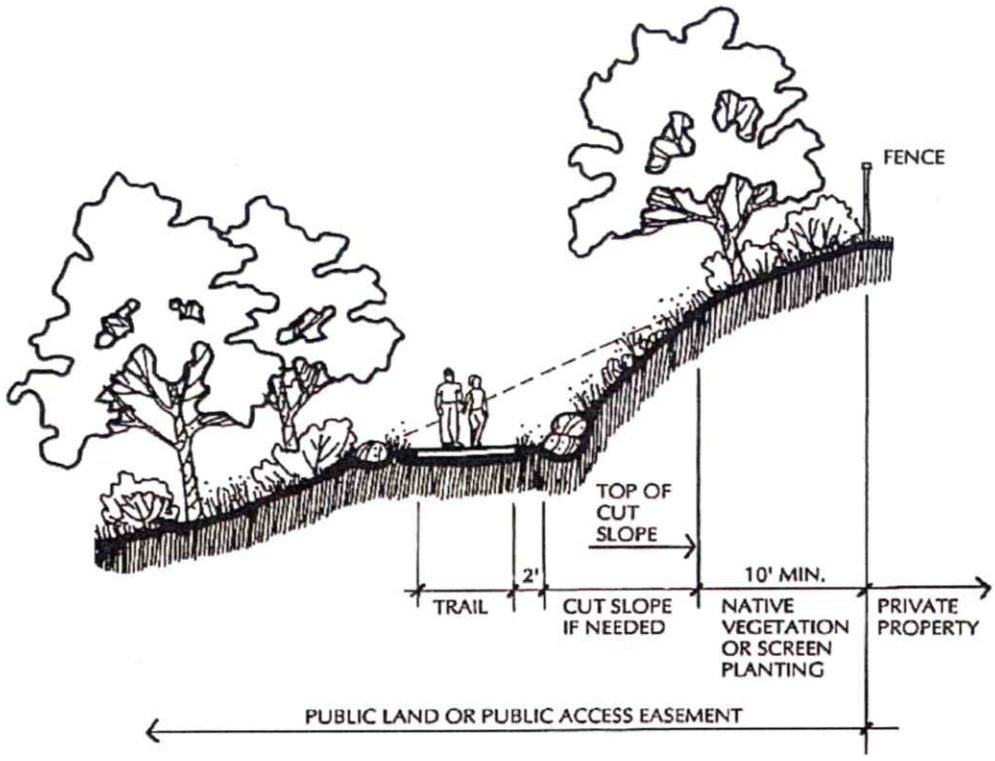
The following guidelines are taken directly from the Uniform Interjurisdictional Trail Design, Use and Management Guidelines, April 1999:

- For shared-use trails, provide 150' setback buffer, where possible, from the top of bank (where the stream is predominantly in its natural state) or 100' from the outside edge of the riparian zone where there are no opportunities for shared use of levees or existing roadways.
- Install signs, barriers and/or fences to limit access to hazards, sensitive habitats or private property.
- Provide buffers such as streets, sidewalks and plantings between trails and residential property.
- Where possible, locate trails adjacent to the front yards, streets and open public spaces, rather than adjacent to private backyards, storage areas or utility areas.
- Grade trail to drain away from natural creeks or sensitive resources.
- Where feasible, provide trails for shared use of levees or other linear open spaces.

TRAIL GUIDELINES AT PROPOSED NEW DEVELOPMENTS



TRAIL GUIDELINES AT EXISTING DEVELOPED PROPERTY



TRAIL CONDITIONS

There are five main conditions in which a trail can occur: on top of a creek bank, on a slope, on a steep slope, along a street, or along a levee. These conditions affect how a trail is constructed.

TRAIL ON TOP OF BANK

The top of bank is the preferred location for a creek trail. The top of bank (or a bench on a slope) is generally flat and can provide a good platform for a trail, and the trail should be setback from the bank a minimum of 50'. Because these areas are flat, grading is kept to a minimum and existing vegetation can be preserved. Erosion and bank stabilization problems are also minimized. Access to and from streets and access by disabled persons is generally easier when the trail is located at the top of bank.

TRAIL ON SLOPE

If a trail must be located on a slope, the less steep the better. A bench will have to be cut into the slope to provide a flat platform for the trail. Because of increased problems with construction, access and erosion, steep slopes should be avoided or minimized. Simple retaining walls can be used to reduce the size of the cut for the trail platform. The cut should be minimized to preserve as much native vegetation as possible. If the drop-off from the trail is steep, a barrier may be needed for safety. Ease of access to and from the street and by disabled persons should be considered when locating a trail on a slope.

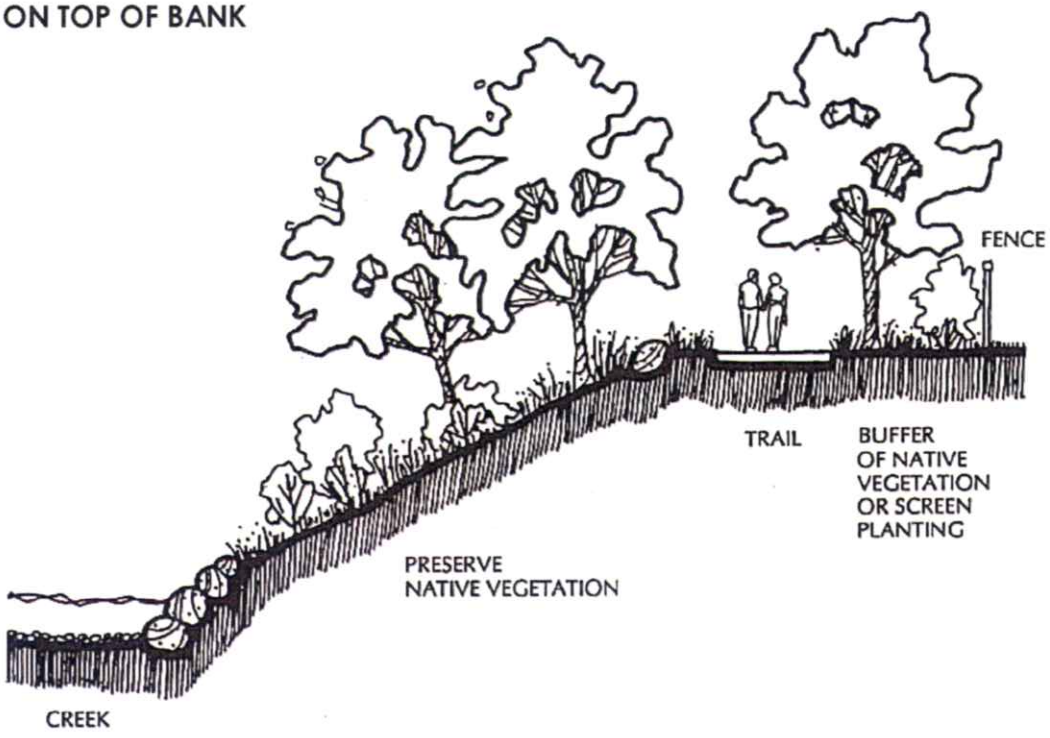
TRAIL ALONG STREET

In some areas there are steep slopes between the creek or open space and an adjacent street. In this case, the best solution may be to construct an expanded sidewalk along the street. This may require a platform for the trial. This solution is preferred over building a trail further down on the steep slope. Native vegetation will be preserved and access to and from the street will not be a problem. If Bicycles are permitted on this type of trail, then the trail must be wide enough to avoid conflict between pedestrians and bicyclists. If there is sufficient width, it would be desirable to separate the trail from the sidewalk with planting, bollards or other barriers.

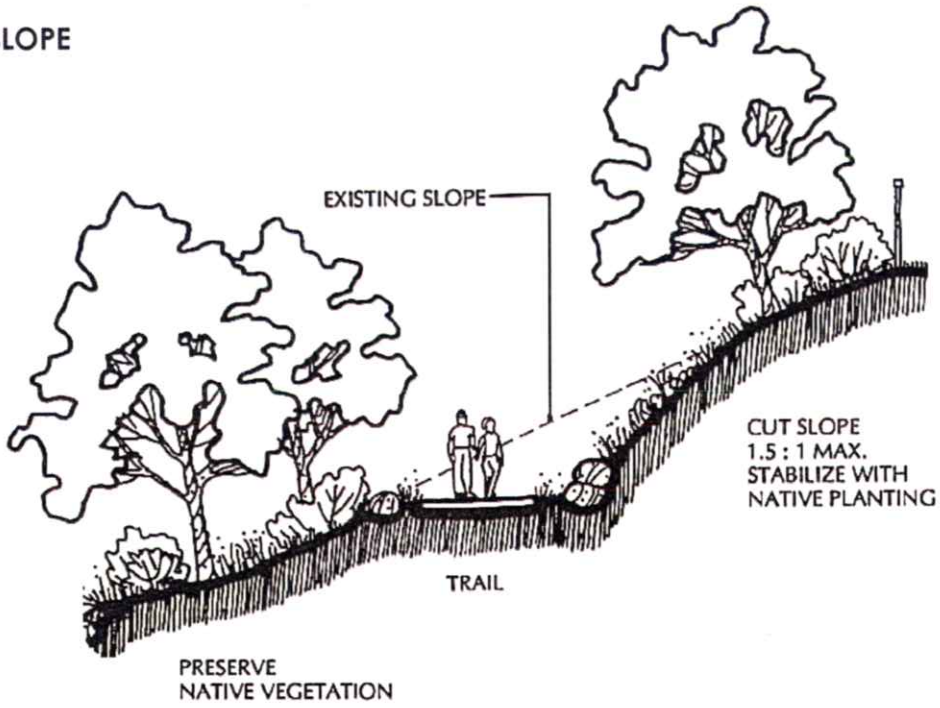
TRAILS ALONG LEVEES

This Study calls for a trail to occur along the Santa Clara Water District's Water Recharge Channel, which parallels US Highway 101. Where existing conditions permit, the plan below should be used. Trails located on levees should be sloped to drain away from the water to prevent pollution.

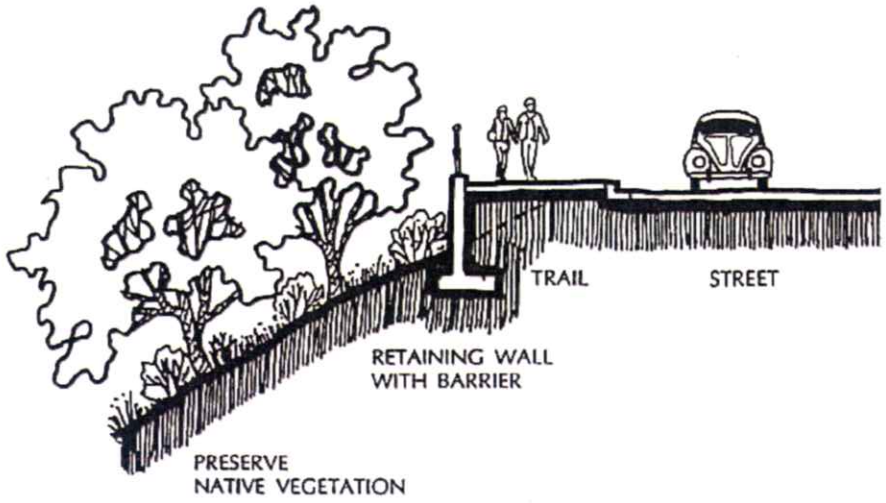
TRAIL ON TOP OF BANK



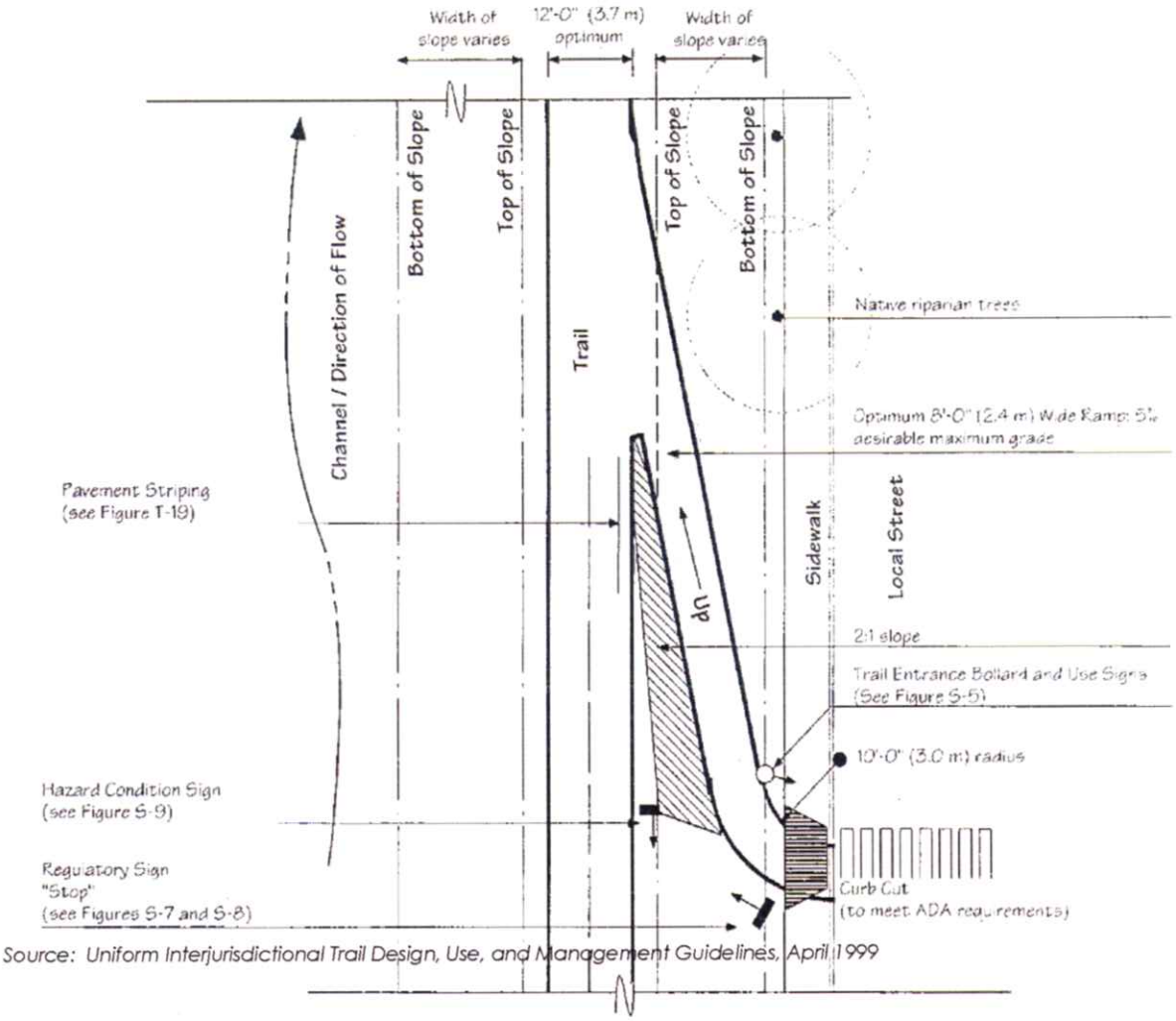
TRAIL ON SLOPE



TRAIL ALONG STREET



TRAIL ALONG LEVEE



Source: Uniform Interjurisdictional Trail Design, Use, and Management Guidelines, April 1999

4.3 STREAM AND STREAMSIDE TRAIL DESIGN

Santa Clara Valley Water District publishes a "Guidance for Trail Design" User Manual for trails next to streams and streamside resources. The recommendations in this document should be followed when planning, designing, and constructing trails near or adjacent to streams in Morgan Hill. The document is available through their website, www.valleywater.org and much of the information in this document is also found in the Uniform Jurisdictional Trail Design, Use and Management Guidelines dated April 15, 1999. Further information can be located in the California State Parks Trail Guidelines, and in the *Guidelines and Standards for Land Use Near Streams*, a publication by the Santa Clara Valley Water Resources Protection Collaborative. The following are excerpts from the "Guidance for Trail Design" document:

While trails are often located near natural and streamside areas for recreation and enjoyment purposes, it is important that the construction, design and use of the trail not negatively impact the nearby stream and stream resources that users of the trail want to enjoy. A biological resource assessment will be required for trail routes along streams or creeks. While there is no standard setback, the general guideline is to locate the trail adjacent to - not within - the riparian corridor.

In designing the trail, the goal is to remove the minimum amount of vegetatation as necessary to accommodate the trail clearing width and to mitigate and restore riparian habitat. Consideration should be given to acquiring additional land rights, where feasible, to place the trail outside the riparian corridor. In addition, the following guidelines should be followed:

- *To control trail use and prevent environmental damage, the design should include barriers such as fences, vegetation, stiles and fallen trees. (UD - 1.3.1.3)*

- *To the maximum extent feasible, trail alignment should avoid impacts to known special status plants and animal habitats. In special status species areas, trail use may be limited as appropriate to ensure protection of these resources. (UD - 1.3.2.1)*

- *Revegetation or enhancement will be undertaken where any sensitive habitat or special status species habitat will be disturbed by construction. The design of an appropriate revegetation program shall fully compensate for the lost habitat and shall be designed by a qualified biologist. Riparian and wetland habitat will typically be mitigated at a 3:1 ratio for high quality habitat areas and at a lower ratio where lower habitat quality justifies a lower ratio. Locally native plants will be utilized in all mitigation work. (UD - 1.3.3.6)*

- *Any cut or fill slopes adjacent to the trail shall be immediately reseeded or replanted. Vegetation will vary by location and surrounding landscape context.*

General Guidelines for Siting of Trails Next to Streams/Stream Crossings:

The objective is to set trails back from the top of bank to avoid erosion over time and protect the existing riparian area.

- *Use existing maintenance trails, access routes and levees wherever possible to minimize impacts of new construction in riparian zones. (UD - 1.3.2.3)*

- *When parallel to a stream or riparian zone and not located on a levee, new trails should be located behind the top of bank or at the back or outside edge of the riparian zone - except where topographic, resource management, or other constraints make this infeasible or undesirable. (UD - 1.3.3.1)*

- *Trails in areas of moderate or difficult terrain and adjacent to a riparian zone shall be composed of natural materials or shall be designed to minimize disturbance, and the need for drainage structures. (UD - 1.3.3.2)*

- *Trail crossings of streams and drainages shall be designed to minimize disturbance through the use of bridges or culverts, whichever is least environmentally damaging. Bridges and culverts should be designed so that they visually and functionally blend with the environment. (UD - 1.3.3.3)*

- *New native riparian vegetation should be planted in the setback zone, where practical, to complement existing vegetation. (UD - 1.3.3.4)*

- *Trails will avoid wetlands, including seasonal wetlands, wherever possible. Trails adjacent to wetlands will be constructed so that trail fills avoid wetland impacts. (UD - 1.3.3.5)*

- *Locate trail alignment and crossings under bridges above the 100 year or 1% flood water surface elevation.*

- *Trail alignment will be limited to one side of the stream to minimize impacts to habitat.*

- *Trail use will generally be limited to the hours between dawn and dusk to minimize impacts to wildlife.*

- *Lighting of trails should be avoided. Exceptions include security lighting in downtown commercial and entertainment areas where lighting should be minimized.*

General Guidelines for Grading and Drainage:

- *No significant grading as defined by local ordinances will be*

used for trail construction unless in conjunction with an approved development project. (UD - 3.5.1)

- *The degree of cut allowed on a slope depends on the soil type, hardness and surrounding natural resources. Cuts should be contoured to blend with the natural slopes. Berms of earth, rocks or wood may be necessary. (UD - 3.5.2)*

- *Use limited terracing or building steps to avoid large-scale grading. Reinforce steps with stone or wood. (UD - 3.5.3)*

- *Surface water shall be diverted from trails by cross sloping the trail tread between 2 and 3%. (UD - 3.5.4)*

- *Where there is potential for significant soil erosion, require a specific erosion control plan. (UD - 3.5.5)*

- *Do not locate irrigation systems within 2 feet of the edge of the trail. Irrigation for turf areas around a trail should use only a pop-up variety of irrigation head. To avoid erosion and undercutting of the trail, the irrigation system should be controlled so that only incidental spray might reach the trail surface and edge. (UD - 3.5.6)*

- *Select plants for streamside areas that do not require irrigation beyond an establishment period.*

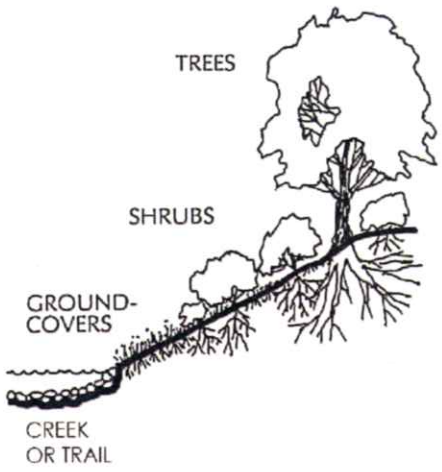
- *Use permeable pavements where possible.*

- *Where overland direction of drainage away from the creek is constrained, provide positive drainage.*

4.4 SLOPE AND BANK PROTECTION

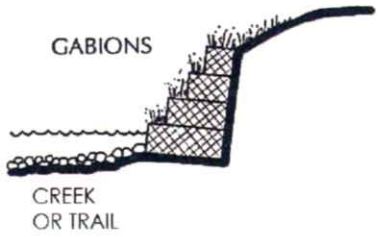
VEGETATIVE BANK STABILIZATION

Root systems of plants provide effective slope protection. Developed root systems bind soil and prevent surface erosion. Riparian vegetation can also slow creek velocities and thereby reduce undercutting erosion of creek banks. Native vegetation should be preserved wherever possible; and where vegetation has been removed, slopes should be replanted with native species.



GABION WALLS

Gabions are rock-filled galvanized wire baskets. They can be stacked into walls or laid flat to form a revetment. Gabions provide low cost structural biotechnical slope protection. They are easily constructed, require little foundation preparation, and are permeable to water. Vegetation such as willow cuttings can be placed in the spaces between the stones. Volunteer plants will usually colonize gabions. In time they can be covered with vegetation and become visually unobtrusive.



RIP RAP

Riprap is a carefully placed layer of stones and boulders. Riprap can be used in most conditions where slope protection is needed on slopes no steeper than 30 degrees. When not mortared, plants can be planted in, or will colonize the spaces between the rocks. In time the riprap can be covered by vegetation and blend into the surrounding landscape.